

AIR WAR COLLEGE

AIR UNIVERSITY

**Missile Defense Acquisition:
Failure is Not an Option**

by

Bruce A. Lloyd, LTC, USA

A Research Report Submitted to the Faculty

In Partial Fulfillment of the Graduation Requirements

Advisor: COL Dwight R. Morgan

26 January 2016

Missile Defense Acquisition: Failure is Not an Option

Disclaimer

The views expressed in this academic research paper are those of the author and do not reflect the official policy or position of the US government, the Department of Defense, or Air University. In accordance with Air Force Instruction 51-303, it is not copyrighted, but is the property of the United States government.



Missile Defense Acquisition: Failure is Not an Option

Biography

LTC Bruce Lloyd is currently a student at the Air War College (AWC), Maxwell Air Force Base, Alabama. Prior to his selection to attend AWC, LTC Lloyd served as the Product Manager for the Ground Based Interceptor Project Office within the Missile Defense Agency at Redstone Arsenal, Alabama from 2012 to 2015. Previous acquisition assignments include: Director, Acquisition, Logistics & Technology (AL&T) for the 404th Army Field Support Brigade and Deputy Commander, Army Field Support Battalion – Hawaii; Assistant Product Manager for the Terminal High Altitude Area Defense (THAAD) Project Office, Redstone Arsenal, Alabama; THAAD Requirements Lead in the Air Defense Directorate of Combat Developments, Fort Bliss, Texas. As an Air Defense Artillery officer (Patriot), LTC Lloyd has held various operational command and staff positions at the platoon through battalion levels. He has deployed to Afghanistan in support of Operation Enduring Freedom and to Saudi Arabia in support of Operation Southern Watch. A native of Turner Oregon, LTC Lloyd enlisted as a Combat Engineer in the Army National Guard in 1988. During his enlistment, he attended Oregon State University where he earned a BS in Economics and subsequently received his commission in the Air Defense Artillery through the Reserve Officer Training Corps in 1992. LTC Lloyd also holds a MS in Information Systems Management from Seattle Pacific University, Seattle Washington. LTC Lloyd's military education includes the Air Defense Officer Basic and Advance Courses, Army Acquisition Basic Course, Combined Arms Service and Staff School, Command and General Staff College, Program Manager's Course and Airborne School. He currently holds Level III Certifications in Program Management and Science & Technology Management from Defense Acquisition University.

Missile Defense Acquisition: Failure is Not an Option

Abstract

North Korea stunned the world in 1998 with the launch of a Taepo Dong-1 ballistic missile over Japan into the sea.¹ With the nation already possessing weapons of mass destruction (WMD), the test launch signaled their intention to develop an Inter-Continental Ballistic Missile (ICBM) capable of reaching the Continental United States.² In 2002, Secretary Rumsfeld made the decision to exempt MDA from the standard acquisition framework defined in the Joint Capabilities Integration Development System (JCIDS) oversight process and DOD 5000.02 Acquisition Instruction.³ In light of the exemption, critics view MDA as possessing limited accountability, transparency, and incomplete engineering. However, the agency's exemption from the standard acquisition framework enables the rapid delivery of critical BMDS capabilities, increased acquisition process agility, and improved engineering rigor over time. With the MDA Director serving as the Milestone Decision Authority and Senior Procurement Executive, the agency's acquisition process is tailorabile, flexible, and more responsive than the typical DOD acquisition process. MDA's internal functional managers provide expert assistance and timely reviews to sustain momentum in the acquisition process. With the introduction of MDA's Acquisition Management Instruction, the agency created a more efficient acquisition environment by removing unnecessary reviews, documentation, and reporting requirements as characterized in typical DOD acquisition programs. Simultaneous BMDS development and operations provides opportunities for early learning, essentially establishing a "self-correcting" acquisition approach with emphasis shifting from research and development to performance and manufacturing quality. This paper recommends continuing BMDS deregulation as it preserves MDA's agility and flexibility in rapidly equipping the Warfighter with improved BMDS capabilities.

Missile Defense Acquisition: Failure is Not an Option

Introduction

North Korea stunned the world in 1998 with the launch of a Taepo Dong-1 ballistic missile over Japan into the sea.⁴ With the nation already possessing nuclear, biological, and chemical weapons of mass destruction (WMD), the test launch signaled their intention to develop an Inter-Continental Ballistic Missile (ICBM) capable of reaching the Continental United States.⁵ At this time, the United States did not possess a ballistic missile defense capability or a missile defense acquisition strategy to defeat ICBM threats. With minimal opposition, Russia, China, North Korea, and now Iran, continue their respective development and expansion of ICBM programs. In 1999, Congress passed the National Missile Defense (NMD) Act forming the Ballistic Missile Defense Organization (BMDO) with the mission to defend the United States from an enemy ballistic missile attacks. The Department of Defense (DOD) renamed BMDO in 2002 to the Missile Defense Agency (MDA).⁶ In the same year, Secretary of Defense Rumsfeld made the decision to exempt MDA from the standard acquisition framework defined in the Joint Capabilities Integration Development System (JCIDS) oversight process and DOD 5000.02 Acquisition Instruction with the intent of fast tracking ballistic missile defense acquisition.⁷ The unprecedented exemption provided the agency maximum acquisition flexibility to rapidly develop and field an initial Ballistic Missile Defense System (BMDS) capability. However, MDA's exemption attracted the attention of critics both inside and outside of DOD. Although critics view MDA as possessing limited accountability, transparency, and incomplete engineering, the agency's exemption from the standard acquisition framework enables the rapid delivery of critical BMDS capabilities, increased acquisition process agility and improved engineering rigor over time. This paper will show that MDA's BMDS acquisition process incorporates more flexibility than the typical DOD system acquisition process in the successful

Missile Defense Acquisition: Failure is Not an Option

development, testing, and fielding of BMDS capabilities against proliferating ballistic missile threats. Finally, this paper recommends DOD maintain MDA's independence from JCIDS oversight and DOD acquisition framework to preserve the agency's agile and flexible approach to BMDS acquisition.

Evolution of Missile Defense Organizations

In 1983, President Reagan launched the Strategic Defense Initiative Organization (SDIO) to combine various space and missile programs under one effort.⁸ The NMD Act of 1999 aligned the SDIO into the Ballistic Missile Defense Organization (BMDO) with the mission to defend the United States from an enemy ballistic missile attacks. The United States withdrew from the Anti-Ballistic Missile (ABM) Treaty in 2002 in response to the growing ballistic missile threat and renamed BMDO to MDA.⁹ Today, MDA encompasses 29 DOD and international programs in support of the President's missile defense strategy with an annual budget of over \$8 billion. MDA's current mission is "to develop, test, and field an integrated, layered, ballistic missile defense system (BMDS) to defend the United States, its deployed forces, allies, and friends against all ranges of enemy ballistic missiles in all phases of flight."¹⁰

Ballistic Missile Threat Proliferation

Countries actively engaged in ballistic missile proliferation view the weapons as a cost-effective offensive military capability and subsequently, a source of national power and coercion. Ballistic missile proliferation is in full force with an increase of over 1,200 ballistic missiles within the past 5 years.¹¹ The transfer of ballistic missile technology between countries directly contributes to proliferation. According to MDA, "Presently, sophisticated ballistic missile technology is available on a wider scale than ever to countries hostile to the U.S. and our allies. As these countries continue to develop and exchange this technology, there is also an increasing

Missile Defense Acquisition: Failure is Not an Option

threat of those technologies falling into the hands of hostile non-state groups.”¹² Russia alone retains over 1,400 nuclear tipped ICBMs deployed and pointed at targets within the United States. Having already developed nuclear payloads, North Korea continues to develop their ICBM delivery vehicles to include the Taepo-Dong 2 and a newly unveiled mobile ICBM, the Hwasong-13.¹³ Since 2008, Iran has developed and tested several short (SRBM) and medium range ballistic missiles (MRBM).¹⁴ Along with their nuclear WMD development ambitions, Iran is forging ahead with their ICBM delivery vehicles. In the guise of a fledgling space exploration program, the volatile nation has developed and conducted multiple flight tests of an ICBM-like space launch vehicle (SLV), capable of delivering a WMD payload.¹⁵ China maintains the most dynamic ballistic missile development and test program in the world with active short, medium, and long-range missile platforms in work. Like North Korea, China has also developed nuclear tipped warheads with intent of reaching the United States.¹⁶ In addition to the threat of ICBMs, the proliferation of short and medium range ballistic missiles constitute hundreds of menacing launchers and warheads within range of United States and Allied forces deployed overseas. MDA Director, VADM James Syring, concisely stated, “The [ballistic missile] threat continues to grow as our potential adversaries are acquiring a greater number of ballistic missiles, increasing their range and making them more complex, survivable, reliable, and accurate.”¹⁷

The rampant proliferation of threat ballistic missiles creates unique challenges for DOD and MDA BMDS acquisition efforts. Threat ballistic missile technologies proliferate and evolve at a faster rate than BMDS acquisition and fielding. Acquisition program managers pursue stable cost, schedule, and performance baselines to deliver capabilities to the Warfighter within budget, time constraints and meet or exceed specified requirements. As ballistic missile threats evolve, BMDS stakeholders must update system requirements in order to adjust to current threat

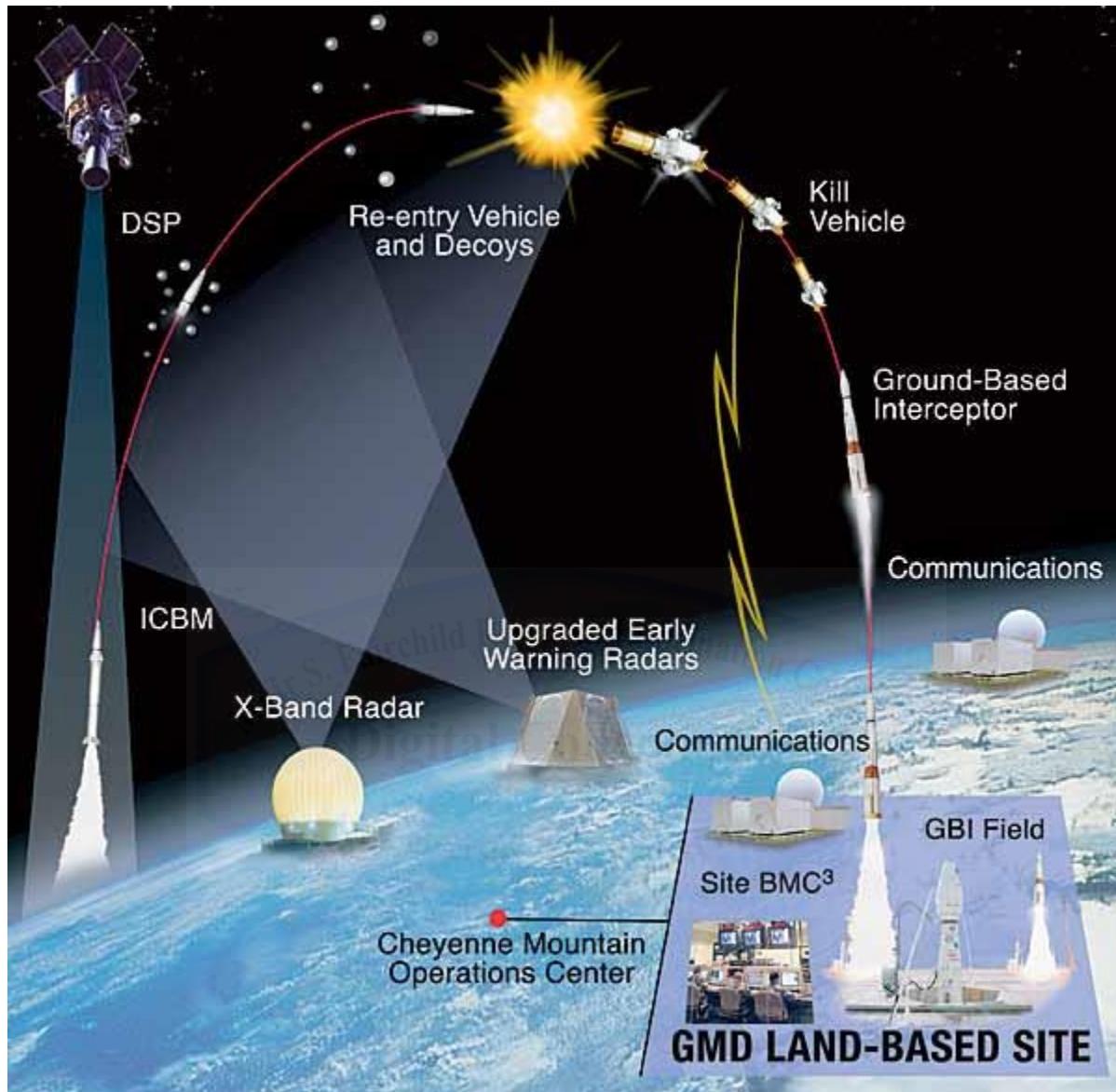
Missile Defense Acquisition: Failure is Not an Option

capabilities. Retired Marine General James Mattis' renowned quote rings true, "The enemy gets a vote."¹⁸ Delivering a new BMDS capability too late is likely to lead to diminished mission relevance or in worst case, be completely ineffective against the new threat. The rapid proliferation and development of threat ballistic missile technologies underscores the importance of BMDS acquisition agility. MDA's BMDS acquisition strategy must be timely, flexible, and agile or risk irrelevance.

BMDS Layered Architecture

Since the NMD Act of 1999, MDA is expanding BMDS capabilities by developing, testing, and deploying missile defense technologies both inside and outside of the United States to counter short, medium, intermediate, and long-range ballistic missile threats.¹⁹ Since ballistic missile threats vary by size, velocity, range, and performance, MDA implemented a "layered" architecture for both the sensor network and BMDS interceptors. The layered architecture approach incorporates an expansive network of ground, sea, and space-based sensors designed to detect, track, and report ballistic missile target data. Using kinetic hit-to-kill and blast fragmentation technologies, MDA designs ground and sea-based interceptors to destroy incoming ballistic missiles before they reach their intended targets.²⁰ For defense of the United States against intermediate to long-range ballistic missile threats (ICBMs), MDA employs the Ground-based Midcourse Defense (GMD) element of the BMDS. The GMD element consists of deployed interceptors, launch facilities, and fire control and communications nodes based in Alaska and California.²¹ USNORTHCOM personnel operate MDA's battle command, control, and communications system, linking sensor and interceptor networks together to detect and defend the homeland from inbound ballistic missile threats. The GMD system represents MDA's only fielded capability against long range ICBMs.²²

Missile Defense Acquisition: Failure is Not an Option



Ground-based Midcourse Defense (GMD): “GMD is a ground-based defense system designed to defend the United States against a limited intermediate and intercontinental ballistic missile attack in the middle part of their flight. Key components include a ground-based interceptor consisting of a booster with a kill vehicle on top, as well as a communication system and a fire control capability. The kill vehicle uses on-board sensors and divert capabilities to steer itself into the threat missile to destroy it.”²³

Missile Defense Acquisition: Failure is Not an Option

Rapid Initial Capability

One of the most important outcomes of BMDS acquisition deregulation is the delivery of a rapid initial capability. The fielding of an initial capability serves as a strategic deterrent to United States' adversaries. In an age of proliferation, the fielding a BMDS reduces the incentive for rogue nations' development and use of ballistic missiles. In December 2004, President George W. Bush issued National Security Presidential Directive-23 (NSPD-23), "National Policy on Ballistic Missile Defense," directing the Department of Defense to deploy a set of initial missile defense capabilities beginning in 2004. The Presidential Directive initiated the delivery of a critical defensive capability against the emerging ballistic missile threat from North Korea and other nations.²⁴Once the Secretary of Defense made the decision to release MDA from JCIDS oversight, the agency was able to begin fielding an initial GMD capability in 2004.²⁵ Prior to this time, no major DOD acquisition program had accomplished the rapid delivery at this scale. In comparison, the acquisition of the Joint Strike Fighter (JSF/F-35) aircraft initiated in 1996 and only recently, started delivery to U.S. units in July 2015. Following rigid JCIDS and DOD 5000 series regulatory oversight and processes, the JSF program took over 19 years to deliver a capability to the warfighter.²⁶Additionally, the JSF program experienced significant cost growth estimated as high as 50 percent over the original baseline.²⁷Similarly, both GMD and JSF system acquisition programs faced highly complex development, requirements, and testing challenges. The Army embarked upon their flagship Future Combat Systems (FCS) program in 2003 with the intent to modernize vehicles and communication networks. DOD cancelled FCS in 2009 due to technical difficulties, cost overruns, and schedule delays. At the time, DOD made the decision to reduce FCS expenditures and redirect funding towards fighting the insurgencies in Iraq and Afghanistan. However, DOD retained and fielded several of the mature FCS

Missile Defense Acquisition: Failure is Not an Option

technologies.²⁸ Both JSF and FCS programs followed the traditional process for the acquisition of a major defense program. Under scrutiny of the JCIDS review process and Congressional oversight, both programs suffered from substantial cost growth, schedule delays, and technical challenges. Although the GMD program also experienced significant cost growth, delays, and technical challenges, MDA was able to rapidly develop, test, and field a capability against proliferating ICBM threats. MDA could not have done so without the exemption from adhering to the processes and oversight described in the standard system acquisition framework.

Criticisms of Missile Defense Deregulation

A 2011 report published by the Government Accounting Office (GAO) criticizes MDA for their lack of transparency, accountability, and limited oversight as compared to most major DOD acquisition programs. According to the GAO, “MDA is a unique agency with extraordinary acquisition flexibility and a challenging mission, however while that flexibility has helped it to rapidly field systems, it has also hampered oversight and accountability.”²⁹ The exemption afforded MDA the exceptional ability to establish and approve their cost, schedule, and performance acquisition baselines within the agency. MDA’s “self-approval” authority is in direct contrast to DOD’s Milestone Decision Authority created by Congress to hold major defense acquisition programs accountable for their respective baselines. Law requires typical defense acquisition programs to document and provide routine Selective Acquisition Reports (SAR) to Congress regarding program performance to established baselines. Since 2004, the GAO urged Congress to take actions to address concerns with the MDA’s perceived lack of transparency. In response, Congress passed legislation requiring MDA to establish baselines for the BMDS and elements. Additionally, Congress, GAO, DOD, and others submit a steady

Missile Defense Acquisition: Failure is Not an Option

stream of inquiries to MDA soliciting SAR information. However, despite the scrutiny, MDA retains Milestone Decision Authority over its program and elements.³⁰

Since 1999, GMD has had mixed success in target intercept flight-tests with just over a 50% success rate (9 intercepts successful of 17).³¹ MDA also conducts rigorous non-intercept flight and ground testing to include sensor characterization, guidance/navigation, and thruster performance. Extensive flight and ground testing provides confidence in the design, reliability, and performance of the BMDS.³² BMDS critics seize upon GMD's lackluster flight test record, denouncing missile defense deregulation and MDA's aggressive acquisition approach as a "rush to failure." However, lessons learned from GMD flight testing serve as proof the program has accomplished significant progress towards improved reliability and performance. Although viewed as unsuccessful tests, BMDS developers learn more about system capabilities, limitations, and vulnerabilities from test failures than successful tests. Flight test failures are not unique to the GMD program. In comparison, Patriot and THAAD ballistic missile defense programs in development endured only 3 of 17 successful intercept attempts between 1983 and 1999.³³ Today, both Patriot and THAAD programs are enormously effective and successful. Against target countermeasures and debris, GMD's last intercept flight test in June 2014 was a resounding success, and the most complex test to date.

The successful intercept capped a five-year streak of developmental challenges and testing failures, illustrating the GMD program's ability to learn from previous failures and persistence in fielding an improved capability to the warfighter. Author Michaela Dodge captured it best stating, "Yes, we must continue to improve and perfect the system, but we also must continue to deploy the capabilities we do have that can keep us one step ahead of the threat. To do otherwise would be to leave ourselves vulnerable to a ballistic-missile attack—inviting a

Missile Defense Acquisition: Failure is Not an Option

catastrophe too grave to contemplate.”³⁴ Ultimately, GMD is the nation’s only defense against long-range ICBMs.³⁵

MDA Acquisition Process Evolution

Once the defense secretary approved MDA’s exemption from OSD JCIDS requirements and the subsequent Joint Requirements Oversight Council (JROC) review process in 2002, DOD transferred control of the missile defense budget to MDA. The BMDS represents DOD’s largest acquisition program with a substantial missile defense budget ranging from \$7 to \$9.5 billion per year.³⁶ Bolstered by the 2004 Presidential Directive at the time, the agency’s primary focus was on the research, development, testing and rapid fielding of an initial BMDS capability. The GAO report on Missile Defense Accountability and Transparency states, “When MDA was established in 2002, it was granted exceptional flexibility in setting requirements and managing the acquisition, in order that its BMDS be developed as a single program, using a capabilities-based, spiral upgrade approach to quickly deliver a set of integrated defensive capabilities. This decision deferred application of DOD acquisition policy to BMDS until a mature capability is ready to be handed over to a military service for production and operation.”³⁷ When originally formed, there was one program element (PE) and one program baseline established for the entire BMDS portfolio. The National Defense Authorization Act (NDAA) of 2008 required MDA to establish additional program elements for each of the BMDS systems as well as respective program acquisition baselines for cost, schedule, performance and risk management for each system element.³⁸ Today, MDA oversees nine system elements and six acquisition baselines for each element: technical, schedule, resource, test, contracts, and operational capacity. The breakdown of BMDS elements and additional acquisition baselines serve as more than a reporting mechanism.³⁹ They provide higher fidelity information, detailed metrics to gauge

Missile Defense Acquisition: Failure is Not an Option

performance and assist program managers in making vital decisions concerning the research, development, testing, and fielding of BMDS capabilities.

Following years of Congressional inquiries and frequent audits from the GAO and DOD-IG, MDA revamped its acquisition process to standardize as well as integrate more structure and accountability. MDA modeled their process after DOD's 5000.02 Acquisition Instruction, but empowered the agency's Director to approve acquisition milestone decisions, program baselines, and retain the ability to tailor the process as required. MDA initially developed the acquisition approach in 2009 and revised it in 2011 and again recently in 2013. According to the 2013 MDA Acquisition Management Instruction, "The MDA acquisition oversight process is a systematic approach which retains flexibility and tailorability while providing "strategic" oversight. The acquisition oversight process uses BMDS program baselines to assess programs and program maturity to determine readiness to continue from phase to phase within the acquisition lifecycle."⁴⁰ Unlike a typical major defense acquisition program, the MDA director fills many additional roles and responsibilities within the agency. The director serves as the overall Program Manager for the BMDS and reports to the Under Secretary of Defense (Acquisition, Technology, and Logistics (USD(AT&L))). Furthermore, the agency's Director takes on senior duties as the BMDS Acquisition Executive, Head of Contracting, and the Senior Procurement Executive.⁴¹ With the Director retaining key authoritative positions within the agency, MDA reviews and approves program baselines within the agency. Although Congress and oversight agencies such as the GAO and DoD-IG view MDA's acquisition process as possessing a lack of transparency and accountability, the agency benefits from the increased flexibility, decreased bureaucracy, and improved efficiencies derived from being appointed as a "self-approval" authority.⁴²

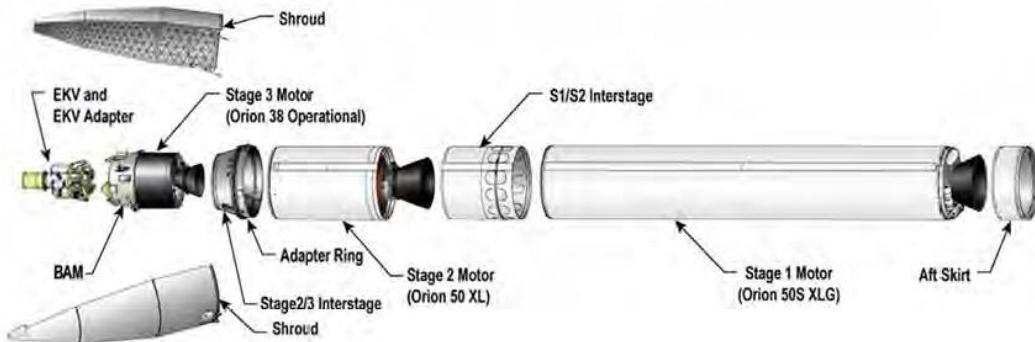
Missile Defense Acquisition: Failure is Not an Option

Innovative Technical Development Requires an Agile Acquisition Process

GMD relies on cutting edge “hit-to-kill” technology and MDA’s network of sensors to intercept inbound threat ICBMs. MDA refers to the GMD system as, “A network of advanced sensors, radars and command, control, battle management, and communication components provide target detection, tracking, and discrimination of countermeasures to assist the interceptor missile in placing itself in the path of the hostile missile, destroying with hit-to-kill technology.”⁴³ Hit-to-kill technology does not use a warhead to destroy threat ballistic missiles. It involves hitting a “bullet with a bullet” in space, originating thousands of miles apart, with extremely high closing velocities. Unlike a NASA space launch vehicle or satellite, GMD interceptors must thrust to a precise location in space at the right moment to intercept the target. Additionally, the space environment presents unique challenges regarding extreme temperatures, light interference, and sensor distortions not observed inside the Earth’s atmosphere. These unique conditions present challenges to the MDA, government, and industry teams in recreating the environments for the design, modeling, simulation, and testing of GMD interceptors. Moreover, GMD tooling, manufacturing processes, and test equipment change with production and design updates. For flight tests, ICBM surrogate target development must keep pace with evolving ballistic missile threats in order to validate GMD system performance. Altogether, MDA relies on its agile and flexible acquisition approach to improve technical designs, test target vehicles, and rapidly field a relevant BMDS capability.

Missile Defense Acquisition: Failure is Not an Option

Ground Based Interceptor:⁴⁴



"The Ground-Based Interceptor is a multi-stage, solid fuel booster with an Exoatmospheric Kill Vehicle (EKV) payload. When launched, the booster carries the EKV toward the target's predicted location in space. Once released from the booster, the EKV uses guidance data transmitted from Ground Support & Fire Control System components and on-board sensors to close with and destroy the target warhead. The impact is outside the Earth's atmosphere using only the kinetic force of the direct collision to destroy the target warhead."⁴⁵

Simultaneous Development and Operations Leads to Early Learning

Due to the relentless progression of the ballistic missile threat environment, MDA conducts simultaneous research, development, testing, and deployment within the GMD program. This continuous cycle enables the program to incorporate needed fixes and improvements into the design of future interceptor deliveries. In a typical major defense acquisition program, research, development, testing, fielding, and operations phases occur in series with milestone reviews at each stage. According to DOD 5000.02, "Operation of the Defense Acquisition System," the acquisition framework follows deliberate developmental phases: material solution analysis (pre-system acquisition); technology maturation and risk reduction; engineering and manufacturing development; production and deployment, and finally, operations and support during sustainment.⁴⁶ MDA fielded the GMD system without fully completing the engineering and manufacturing development phase.⁴⁷ MDA's acquisition

Missile Defense Acquisition: Failure is Not an Option

approach of concurrent execution of these phases involves users and industry partners earlier than in the standard acquisition process. This “early learning” provides valuable feedback for incorporation into system technical requirements, design, upgrade and application of new BMDS technologies. However, in pursuing a rapid BMDS capability, the concurrency of the acquisition phases does not come without a cost. The overlapping of critical acquisition phases leads to increased programmatic challenges to include cost, schedule, and technical risks. For example, technical issues discovered in ground or flight testing can be difficult to fix and incorporate into a design that is already in production. Latent technical issues often result in costly disruptions and delays for complex system acquisition programs. The corresponding fixes to address latent discoveries in production must then be applied to fielded interceptors in the fleet.⁴⁸ In the end, MDA’s agile and concurrent acquisition approach provides a BMDS capability that may be imperfect, but is better than no capability at all.

MDA Acquisition Process Agility and Flexibility

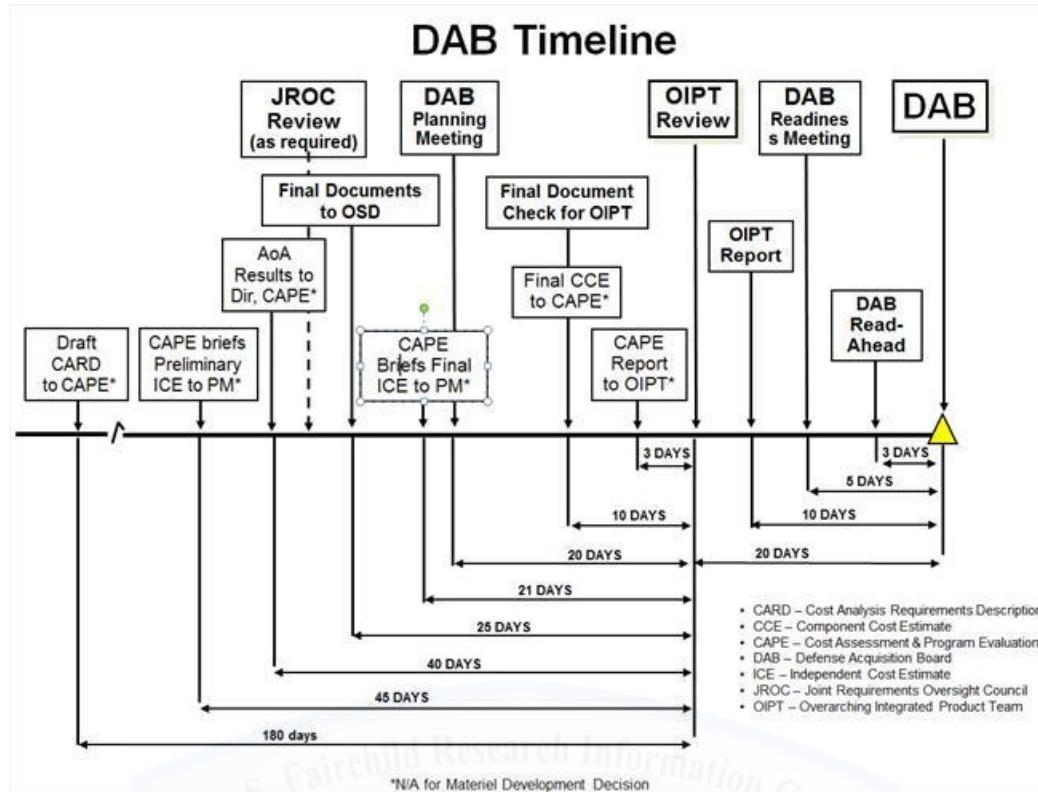
Major defense acquisition programs have historically suffered from the reputation of being bureaucratic, inefficient, and extremely expensive. Since 2001, DOD has expended over \$46 billion on system acquisition programs that cancelled prior to fielding.⁴⁹ In an era of declining defense spending, DOD cannot afford to mismanage system acquisition efforts. Honorable Frank Kendall, Under Secretary Defense for Acquisition, Technology, and Logistics (USD AT&L) developed the “Better Buying Power” approach to improve system acquisition. The latest iteration (3.0) of Better Buying Power seeks to continue pursuing productivity, affordability, and efficiency efforts within DOD AT&L programs. One of the key principles of BBP 3.0 is the elimination of unproductive processes and bureaucracy. In eliminating unproductive processes and bureaucracy, BBP 3.0 proposes four primary lines of effort:

Missile Defense Acquisition: Failure is Not an Option

1. Emphasize acquisition chain of command responsibility, authority, and accountability.
2. Reduce cycle times while ensuring sound investments.
3. Streamline documentation requirements and staff reviews.
4. Remove unproductive requirements imposed on industry.⁵⁰

With MDA's Director serving as the agency's Defense Acquisition Executive and Milestone Decision Authority, MDA program elements benefit from a close relationship and increased access within the chain of command. With less bureaucracy and fewer organizational layers to get through, the MDA Director serving as the agency's Senior Procurement Executive also drastically limits review cycles and facilitates timely decisions within the agency.⁵¹ In contrast, the typical OSD major defense acquisition program must follow a cumbersome process in attaining a material development decision. The following diagram represents the nominal timeline for a program to get to the Defense Acquisition Board (DAB) review for a milestone review decision.⁵²

Missile Defense Acquisition: Failure is Not an Option



The DAB nominal flow is approximately 200 days once all of the evidence, documentation, and presentation materials have been prepared. Due to the requirements of numerous external stakeholders within OSD, the process takes almost seven months to get to a critical decision from the DAB. The nominal timeline assumes there are no significant delays in obtaining interim approvals by the JROC or OIPT. The JROC review, DAB Planning Meetings, Overarching Integrated Product Team (OIPT) and DAB can extend the process beyond the 200 days nominal flow, based on the amount of rework required.⁵³ With innovative research and development within highly complex system acquisitions, there are technical challenges that have the potential to influence cost and schedule baselines during the arduous process to get to the DAB. Significant changes have the ability to derail progress to a DAB decision. Within MDA, program elements are able to staff critical milestone decisions through supporting functional organizations to the MDA director in a matter of weeks.⁵⁴ For example, it took GMD only 2

Missile Defense Acquisition: Failure is Not an Option

weeks to staff a 20-page acquisition plan through MDA for the Redesigned Kill Vehicle. The OSD version of the document is more than 80 pages and still in staffing at the time of this writing.

MDA's exemption from OSD's JCIDS oversight and acquisition framework has enabled the MDA Director to streamline the process by authorizing tailored documentation requirements and staff reviews. In contrast to OSD's external functional reviews, MDA utilizes internal functional managers to integrate their respective plans into the program element's acquisition strategy.⁵⁵ MDA's functional baselines consist of resource, schedule, technical, test, contracts, and operational capacity.⁵⁶ The supporting functional organizations under MDA umbrella have a stake in the success of the program element. Unlike their OSD counterparts, MDA functional managers possess unique insights and knowledge regarding missile defense. The MDA Director empowers his functional managers with the authority to review, approve, and expedite processing of key documents.⁵⁷ As a result, MDA functional managers are more responsive than their external counterparts and the program elements experience fewer "surprises" in working towards a milestone decision. Overall, the exemption from OSD's acquisition process enables the MDA Director to eliminate unproductive processes and bureaucracy, supporting the initiatives of BBP 3.0. Tailored documentation and reviews, combined with responsive internal functional managers further contribute to MDA's streamlined, agile, and flexible acquisition process.

MDA's Transition from Spiral to Deliberate Development

Following the creation of MDA in 2002, the agency's primary focus was to establish an initial ballistic missile defense capability. A recent DOD IG Report on MDA Quality Assurance and Reliability states, "National Security Presidential Directive-23 (NSPD-23) directed the

Missile Defense Acquisition: Failure is Not an Option

Department of Defense to deploy a set of initial missile defense capabilities beginning in 2004. NSPD-23 resulted in the fielding of initial missile defense capabilities before rigorous testing was complete to validate performance. Schedule constraints also necessitated the need to field GMD prototype assets.⁵⁸ Due to emerging ICBM threats, the president and subsequently DOD chose not to delay fielding the GMD system for a more mature capability. MDA used an evolutionary approach to system acquisition called, “spiral development.”⁵⁹ Spiral development originated as a software development methodology. It involves releasing software builds based on meeting a specified level of development and requirements. The software would still contain bugs, but would deliver a capability and level of performance. Similarly, MDA’s intent early on was to deliver BMDS capabilities in two-year capability blocks or “spirals” with the philosophy that an imperfect capability in the field sooner is better than a mature capability years down the line.⁶⁰ System upgrades and fixes would then be included in the next block delivery. In 2002, Secretary of Defense Donald Rumsfeld captured the intent of spiral development in a memo to the USD (AT&L) stating the priority for the Pentagon is, “to develop and test technologies as they become available or when there warrants an accelerated capability. Improve the BMD system through incremental improvements and block upgrades to BMDS elements over time.”⁶¹ Using the spiral approach enabled MDA to “rollout” the latest capabilities in rapid succession. However, the two-year capability blocks made it difficult for external oversight and tracking of cost, schedule, and technical performance program metrics.⁶²

In March 2009, John Pendleton, GAO Director for Defense Capabilities and Management, submitted a statement to Congress, “MDA’s flexible acquisition approach has limited the ability for DOD and congressional decision makers to measure MDA’s progress on cost, schedule, and testing.”⁶³ Mounting pressures from the Congressional Budget Office

Missile Defense Acquisition: Failure is Not an Option

(CBO), GAO, and DOD-IG urged MDA to discontinue their capability-by-block delivery approach to enhance the transparency, accountability, and oversight of BMDS programs. In the face of technical development challenges and test failures, MDA also found it difficult to meet the aggressive two-year capability-by-block delivery schedule.⁶⁴ Cutting-edge research and development combined with the exploration of new technologies makes it difficult for MDA program elements to adhere to strict delivery timelines. Consequently, missed milestones and extended schedules result in substantial cost growth to the program element's baselines. In 2009, MDA discontinued the spiral development and transitioned to a more deliberate acquisition approach as described in the agency's acquisition management instruction.⁶⁵

Increased Acquisition Process Rigor over Time

BMDS acquisition deregulation enabled MDA to fast track an initial GMD capability by spiraling and fielding prototype designs. Once established, the program element was able to address improvements to their engineering rigor, production quality, and manufacturing processes. In turn, the GMD program shifted its emphasis to interceptor repairs, upgrades, and redesigns to increase system reliability and availability. BMDS acquisition has become a self-correcting system. As a result, acquisition process and engineering rigor increases over time, in tandem with the maturation of BMDS technologies. With the increase in acquisition process and engineering rigor, external independent assessments serve to validate MDA's Acquisition Management Instruction. GAO and DOD-IG conduct regular audits and assessments of MDA program element baselines. Additionally, the MDA Director invites routine Cost Assessment and Program Evaluation (CAPE) team visits. The CAPE's mission is to, "Provide the Department of Defense with timely, insightful, and unbiased analysis on resource allocation, and cost estimation problems to deliver the optimum portfolio of military capabilities through

Missile Defense Acquisition: Failure is Not an Option

efficient and effective use of each taxpayer dollar.”⁶⁶ Finally, OSD formed the Missile Defense Executive Board (MDEB) in 2007 to provide oversight over MDA program priorities, baselines, and facilitate timely delivery of BMDS capabilities to the Warfighter.⁶⁷ Overall, the increase in independent assessments provides additional oversight to MDA’s acquisition approach and improves the agency’s transparency and accountability.

Conclusion

Although critics view MDA as possessing limited accountability, transparency, and incomplete engineering, the agency’s exemption from the standard acquisition framework enables the rapid delivery of critical BMDS capabilities, increased acquisition process agility, and improved engineering rigor over time. MDA’s BMDS acquisition process incorporates more flexibility than the typical DOD system acquisition process in the successful development, testing, and fielding of BMDS capabilities against proliferating ballistic missile threats. In line with BBP 3.0, BMDS program elements benefit from having the Milestone Decision Authority and Senior Procurement Executive within the chain of command, further adding to the agility and responsiveness of MDA’s flexible acquisition process. MDA’s internal functional managers provide expert assistance and timely reviews to sustain momentum in the acquisition process. With the introduction of MDA’s Acquisition Management Instruction, the agency created a more efficient acquisition environment by removing unnecessary reviews, documentation, and reporting requirements as characterized in typical DOD acquisition programs. Under congressional oversight, the GAO, DOD-IG, and CAPE conduct routine external audits and assessments of MDA baselines, improving accountability and transparency within the agency. Simultaneous BMDS development and operations provides opportunities for early learning, essentially establishing a “self-correcting” acquisition approach with emphasis shifting from

Missile Defense Acquisition: Failure is Not an Option

research and development to performance and manufacturing quality. MDA's transition from a spiral to a deliberate development approach increased acquisition process, engineering, and quality rigor. In the face of a menacing ballistic missile threat, this paper strongly recommends DOD maintain MDA's independence from JCIDS oversight and cumbersome requirements inherent in the DOD acquisition framework. Continued BMDS deregulation preserves MDA's agility and flexibility in rapidly equipping the Warfighter with improved BMDS capabilities to counter the evolving threat. The US must not falter in its pursuit of an effective BMDS for the defense and survival of the nation. Failure is not an option.



Missile Defense Acquisition: Failure is Not an Option

Notes

¹ Sheryl WuDunn, “North Korea Fires Missile Over Japanese Territory,” *New York Times*, 1 September 1998, <http://www.nytimes.com/1998/09/01/world/north-korea-fires-missile-over-japanese-territory.html>.

² Ibid.

³ Government Accountability Office (GAO), *Missile Defense: Opportunity to Refocus on Strengthening Acquisition Management*. Report to Congressional Committees, Report no. GAO-13-432, April 2013, p. 6.

⁴ WuDunn, 1998.

⁵ Ibid.

⁶ Institute for Defense Analyses, “Study on the Mission, Roles, and Structure of the Missile Defense Agency (MDA).” IDA Paper P-4374, 2008, p. II-2.

⁷ Government Accountability Office (GAO), *Missile Defense: Opportunity to Refocus on Strengthening Acquisition Management*. Report to Congressional Committees, Report no. GAO-13-432, April 2013, p. 6.

⁸ Institute for Defense Analyses, p. II-1.

⁹ Institute for Defense Analyses, p. II-3.

¹⁰ Missile Defense Agency (MDA), “Our Mission.” Accessed 21 September 2015, <http://www.mda.mil/about/mission.html>.

¹¹ Missile Defense Agency (MDA), “The Ballistic Missile Defense System (BMDS),” Accessed 21 September 2015. <http://www.mda.mil/system/system.html>.

¹² Ibid.

¹³ National Air and Space Intelligence Center (NASIC). *Ballistic & Cruise Missile Threat*, Report no. NASIC-1031-0985-13, 2013, p. 3.

¹⁴ Ibid.

¹⁵ Ibid.

¹⁶ Ibid.

¹⁷ Michaela Dodge, “American Missile Defense: Why Failure IS an Option,” 17 July 2014, <http://www.heritage.org/research/commentary/2014/7/american-missile-defense-why-failure-is-an-option>.

¹⁸ Vago Muradian, “Interview: Gen. James Mattis, Commander, U.S. Joint Forces Command,” 23 May 2010, <http://archive.defensenews.com/article/20100523/DEFEAT03/5230301/Gen-James-Mattis>.

¹⁹ Institute for Defense Analyses, p. II-3.

²⁰ Missile Defense Agency (MDA), “BMDS Fact Sheet,” Accessed 21 September 2015, http://www.mda.mil/news/fact_sheets.html.

²¹ Missile Defense Agency (MDA), “GMD Fact Sheet,” Accessed 21 September 2015, http://www.mda.mil/news/fact_sheets.html.

²² Ibid.

²³ Government Accountability Office (GAO), *Missile Defense: Opportunities Exist to Reduce Acquisition Risk and Improve Reporting on System Capabilities*, Report to Congressional Committees, Report no. GAO-15-345, May 2015, p. 6.

²⁴ Institute for Defense Analyses, p. II-3.

Missile Defense Acquisition: Failure is Not an Option

²⁵ Institute for Defense Analyses, p. II-4.

²⁶ Colin Clark, “DoD Acquisition Starting To Turn Corner? F-35 Costs Down 2%,” *Breaking Defense*, 19 March 2015, <http://breakingdefense.com/2015/03/dod-acquisition-starting-to-begin-to-turn-corner-f-35-costs-down-2/>.

²⁷ Ibid.

²⁸ Rand Corporation. *Lessons from the Army Future Combat Systems Program*. Report no. 2012045151, 2012, p. 2.

²⁹ Government Accountability Office (GAO), *Missile Defense: Actions Needed to Improve Transparency and Accountability*. Report to Congressional Committees, Report no. GAO-11-555T, April 2011, p. 2.

³⁰ GAO-11-555T, p. 3.

³¹ Missile Defense Agency (MDA), “BMDS Test Record,” Accessed 21 September 2015, http://www.mda.mil/news/fact_sheets.html.

³² Ibid.

³³ Andrew Howells, “Missile Defense Reliability: A Tally of Test Failures,” *Coalition to Reduce Nuclear Dangers Issue Brief*, Vol. 3, No. 6, 1 July 1999.

³⁴ Dodge, 2014.

³⁵ Ibid.

³⁶ GAO-11-555T, p. 1.

³⁷ GAO-11-555T, p. 3.

³⁸ GAO-11-555T, p. 6.

³⁹ Missile Defense Agency (MDA) Instruction 5013.02-INS, *Acquisition Management*, 24 August 2013, p. 4.

⁴⁰ 5013.02-INS., p. 6.

⁴¹ 5013.02-INS., p. 58.

⁴² 5013.02-INS., p. 6.

⁴³ Missile Defense Agency (MDA). “BMDS Fact Sheet.” Accessed 21 September 2015, http://www.mda.mil/news/fact_sheets.html.

⁴⁴ Department of Defense Inspector General (DoD-IG), *Exoatmospheric Kill Vehicle Quality Assurance and Reliability Assessment*, Report No. DODIG-2014-111, 8 September 2014, p. 6.

⁴⁵ Missile Defense Agency (MDA), “Elements,” Accessed 21 September 2015, <http://www.mda.mil/system/gmd.html>.

⁴⁶ Department of Defense Instruction 5000.02. *Operation of the Defense Acquisition System*. 7 January 2015, p. 6.

⁴⁷ Victoria Samson, *American Missile Defense, A Guide to the Issues*, Santa Barbara, California: Praeger Publishing, 2010, p. 30.

⁴⁸ Government Accountability Office (GAO), *Missile Defense: Opportunity to Refocus on Strengthening Acquisition Management*, Report to Congressional Committees, Report no. GAO-13-432, April 2013, p. 18.

⁴⁹ Marcus Weisgerber, “Slow and Steady is Losing,” *Government Executive*, <http://www.govexec.com/feature/slow-and-steady-losing-defense-acquisition-race/>.

⁵⁰ Office of the Under Secretary of Defense For Acquisition, Technology and Logistics. *Implementation Directive for Better Buying Power 3.0 – Achieving Dominant Capabilities through Excellence and Innovation*, 9 April 2015, pp. 18-22.

Missile Defense Acquisition: Failure is Not an Option

⁵¹ Scott Vickers (Program Director, Ground-based Missile Defense, Missile Defense Agency), interview by the author, 4 September 2015.

⁵² Defense Acquisition University, “Defense Acquisition Board Timeline,” <https://acc.dau.mil/CommunityBrowser.aspx?id=294457&lang=en-US>.

⁵³ Ibid.

⁵⁴ 5013.02-INS., p. 6.

⁵⁵ 5013.02-INS., p. 18.

⁵⁶ 5013.02-INS., p. 42.

⁵⁷ 5013.02-INS., p. 25.

⁵⁸ Department of Defense Inspector General (DoD-IG), *Exoatmospheric Kill Vehicle Quality Assurance and Reliability Assessment*, Report No. DODIG-2014-111, 8 September 2014, p. 4.

⁵⁹ Victoria Samson, *American Missile Defense, A Guide to the Issues*, Santa Barbara, California: Praeger Publishing, 2010, p. 28.

⁶⁰ Ibid.

⁶¹ Samson, p. 30.

⁶² Samson, p. 31.

⁶³ Samson, p. 33.

⁶⁴ Samson, p. 28.

⁶⁵ Samson, p. 37.

⁶⁶ Office of the Secretary of Defense, *Cost Assessment & Program Evaluation (CAPE)*, Accessed 21 September 2015, <http://www.cape.osd.mil/>.

⁶⁷ Institute for Defense Analyses, p. ES-2.

Missile Defense Acquisition: Failure is Not an Option

Bibliography

Clark, Colin, "DoD Acquisition Starting To Turn Corner? F-35 Costs Down 2%," *Breaking Defense*, 19 March 2015, <http://breakingdefense.com/2015/03/dod-acquisition-starting-to-begin-to-turn-corner-f-35-costs-down-2/>.

Defense Acquisition University, "Defense Acquisition Board Timeline,"
<https://acc.dau.mil/CommunityBrowser.aspx?id=294457&lang=en-US>

Department of Defense Instruction 5000.02, *Operation of the Defense Acquisition System*, 7 January 2015.

Department of Defense Selected Acquisition Report (SAR) for FY2015, *F-35 Joint Strike Fighter Aircraft (F-35)*, 2015.

Department of Defense Inspector General (DoD-IG), *Exoatmospheric Kill Vehicle Quality Assurance and Reliability Assessment*, Report No. DODIG-2014-111, 8 September 2014.

Dodge, Michaela, "American Missile Defense: Why Failure IS an Option," 17 July 2014,
<http://www.heritage.org/research/commentary/2014/7/american-missile-defense-why-failure-is-an-option>.

Government Accountability Office (GAO), *Missile Defense: Actions Needed to Improve Transparency and Accountability*, Report to Congressional Committees, Report no. GAO-11-555T, April 2011.

Government Accountability Office (GAO), *Missile Defense: Opportunity to Refocus on Strengthening Acquisition Management*, Report to Congressional Committees, Report no. GAO-13-432, April 2013.

Government Accountability Office (GAO), *Missile Defense: Opportunities Exist to Reduce Acquisition Risk and Improve Reporting on System Capabilities*, Report to Congressional Committees, Report no. GAO-15-345, May 2015.

Howells, Andrew, "Missile Defense Reliability: A Tally of Test Failures," *Coalition to Reduce Nuclear Dangers Issue Brief*, Vol. 3, No. 6, 1 July 1999.

Institute for Defense Analyses, "Study on the Mission, Roles, and Structure of the Missile Defense Agency (MDA)," IDA Paper P-4374, 2008, p. II-2.

Missile Defense Agency (MDA) Instruction 5013.02-INS, *Acquisition Management*, 24 August 2013.

Missile Defense Agency (MDA), "The Ballistic Missile Defense System (BMDS)," Accessed 21 September 2015, <http://www.mda.mil/system/system.html>.

Missile Defense Acquisition: Failure is Not an Option

Missile Defense Agency (MDA), “BMDS Fact Sheet,” Accessed 21 September 2015.
http://www.mda.mil/news/fact_sheets.html.

Missile Defense Agency (MDA), “BMDS Test Record,” Accessed 21 September 2015.
http://www.mda.mil/news/fact_sheets.html.

Missile Defense Agency (MDA), “Elements,” Accessed 21 September 2015.
<http://www.mda.mil/system/gmd.html>.

Missile Defense Agency (MDA), “GMD Fact Sheet,” Accessed 21 September 2015.
http://www.mda.mil/news/fact_sheets.html.

Missile Defense Agency (MDA), “Our Mission,” Accessed 21 September 2015. <http://www.mda.mil/about/mission.html>.

Muradian, Vago, “Interview: Gen. James Mattis, Commander, U.S. Joint Forces Command,” 23 May 2010, <http://archive.defensenews.com/article/20100523/DEFEAT03/5230301/Gen-James-Mattis>.

National Air and Space Intelligence Center (NASIC). *Ballistic & Cruise Missile Threat*, Report no. NASIC-1031-0985-13, 2013.

Office of the Secretary of Defense, *Cost Assessment & Program Evaluation (CAPE)*. Accessed 21 September 2015, <http://www.cape.osd.mil/>.

Office of the Under Secretary of Defense For Acquisition, Technology and Logistics, *Implementation Directive for Better Buying Power 3.0 – Achieving Dominant Capabilities through Excellence and Innovation*, 9 April 2015.

Rand Corporation, *Lessons from the Army Future Combat Systems Program*, Report no. 2012045151, 2012.

Samson, Victoria, *American Missile Defense, A Guide to the Issues*, Santa Barbara, California: Praeger Publishing, 2010.

Scott Vickers, (Program Director, Ground-based Missile Defense, Missile Defense Agency), interview by the author, 4 September 2015.

Weisgerber, Marcus, “Slow and Steady is Losing,” *Government Executive*.
<http://www.govexec.com/feature/slow-and-steady-losing-defense-acquisition-race/>.

WuDunn, Sheryl, “North Korea Fires Missile Over Japanese Territory,” *New York Times*, 1 September 1998, <http://www.nytimes.com/1998/09/01/world/north-korea-fires-missile-over-japanese-territory.html>.